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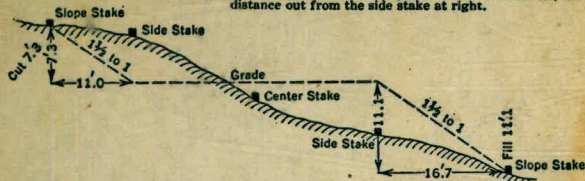
589

589

**DISTANCES FROM SIDE STAKES FOR CROSS-SECTIONING**

Roadway of any Width. Side Slopes 1 1/2 to 1.

In the figure below: opposite 7 under "Cut or Fill" and under 3 read 11.0, the distance out from the side stake at left. Also, opposite 11 under "Cut or Fill" and under .1 read 16.7, the distance out from the side stake at right.



Cut or Fill	Distance out from Side or Shoulder Stake										Cut or Fill
	0	.1	.2	.3	.4	.5	.6	.7	.8	.9	
0	0.0	0.2	0.3	0.5	0.6	0.8	0.9	1.1	1.2	1.4	0
1	1.5	1.7	1.8	2.0	2.1	2.3	2.4	2.6	2.7	2.9	1
2	3.0	3.2	3.3	3.5	3.6	3.8	3.9	4.1	4.2	4.4	2
3	4.5	4.7	4.8	5.0	5.1	5.3	5.4	5.6	5.7	5.9	3
4	6.0	6.2	6.3	6.5	6.6	6.8	6.9	7.1	7.2	7.4	4
5	7.5	7.7	7.8	8.0	8.1	8.3	8.4	8.6	8.7	8.9	5
6	9.0	9.2	9.3	9.5	9.6	9.8	9.9	10.1	10.2	10.4	6
7	10.5	10.7	10.8	11.0	11.1	11.3	11.4	11.6	11.7	11.9	7
8	12.0	12.2	12.3	12.5	12.6	12.8	12.9	13.1	13.2	13.4	8
9	13.5	13.7	13.8	14.0	14.1	14.3	14.4	14.6	14.7	14.9	9
10	15.0	15.2	15.3	15.5	15.6	15.8	15.9	16.1	16.2	16.4	10
11	16.5	16.7	16.8	17.0	17.1	17.3	17.4	17.6	17.7	17.9	11
12	18.0	18.2	18.3	18.5	18.6	18.8	18.9	19.1	19.2	19.4	12
13	19.5	19.7	19.8	20.0	20.1	20.3	20.4	20.6	20.7	20.9	13
14	21.0	21.2	21.3	21.5	21.6	21.8	21.9	22.1	22.2	22.4	14
15	22.5	22.7	22.8	23.0	23.1	23.3	23.4	23.6	23.7	23.9	15
16	24.0	24.2	24.3	24.5	24.6	24.8	24.9	25.1	25.2	25.4	16
17	25.5	25.7	25.8	26.0	26.1	26.3	26.4	26.6	26.7	26.9	17
18	27.0	27.2	27.3	27.5	27.6	27.8	27.9	28.1	28.2	28.4	18
19	28.5	28.7	28.8	29.0	29.1	29.3	29.4	29.6	29.7	29.9	19
20	30.0	30.2	30.3	30.5	30.6	30.8	30.9	31.1	31.2	31.4	20
21	31.5	31.7	31.8	32.0	32.1	32.3	32.4	32.6	32.7	32.9	21
22	33.0	33.2	33.3	33.5	33.6	33.8	33.9	34.1	34.2	34.4	22
23	34.5	34.7	34.8	35.0	35.1	35.3	35.4	35.6	35.7	35.9	23
24	36.0	36.2	36.3	36.5	36.6	36.8	36.9	37.1	37.2	37.4	24
25	37.5	37.7	37.8	38.0	38.1	38.3	38.4	38.6	38.7	38.9	25
26	39.0	39.2	39.3	39.5	39.6	39.8	39.9	40.1	40.2	40.4	26
27	40.5	40.7	40.8	41.0	41.1	41.3	41.4	41.6	41.7	41.9	27
28	42.0	42.2	42.3	42.5	42.6	42.8	42.9	43.1	43.2	43.4	28
29	43.5	43.7	43.8	44.0	44.1	44.3	44.4	44.6	44.7	44.9	29
30	45.0	45.2	45.3	45.5	45.6	45.8	45.9	46.1	46.2	46.4	30
31	46.5	46.7	46.8	47.0	47.1	47.3	47.4	47.6	47.7	47.9	31
32	48.0	48.2	48.3	48.5	48.6	48.8	48.9	49.1	49.2	49.4	32
33	49.5	49.7	49.8	50.0	50.1	50.3	50.4	50.6	50.7	50.9	33
34	51.0	51.2	51.3	51.5	51.6	51.8	51.9	52.1	52.2	52.4	34
35	52.5	52.7	52.8	53.0	53.1	53.3	53.4	53.6	53.7	53.9	35
36	54.0	54.2	54.3	54.5	54.6	54.8	54.9	55.1	55.2	55.4	36
37	55.5	55.7	55.8	56.0	56.1	56.3	56.4	56.6	56.7	56.9	37
38	57.0	57.2	57.3	57.5	57.6	57.8	57.9	58.1	58.2	58.4	38
39	58.5	58.7	58.8	59.0	59.1	59.3	59.4	59.6	59.7	59.9	39
40	60.0	60.2	60.3	60.5	60.6	60.8	60.9	61.1	61.2	61.4	40

KEUFFEL & ESSER CO., N. Y.

MICROFILMED

JAN 13 1965

The paper in this book No. F370A  
is made of 50% high grade rag stock  
with a WATER RESISTING surface sizing.

10,455. cm, h. ai. cM.



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MICROFILMED

JAN 19 1968

In th  
from  
Cut 24

Cut or  
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Check on Bench Levels

cont. from F.B. 554  
pg. 78

Date - 10/15/41 Jackson 1  
Weather Fair King  
Warm

Sta. + H.I. - Elev

T.P. 532.375

1.785 534.16

T.P. 13055 521.105

1.60 522.705

A-35

B.M. 5.43 517.275 — out

1.195 518.47

T.P. 10.97 507.50

2.695 510.195

A-36

B.M. 4.285 500.91 — out

3.47 504.38

T.P. 12.63 491.75

1.82 493.57

T.P. 10.415 483.155



Check on Bench Levels  
on Dam-Site

Sta + H.I. - Elev.

T.P. 483.155

1.435 484.59

#1 476.89  
B.M. 7.72 476.87

Error 0.02

Check on Bench Levels  
along Ramona Highway  
North of Dam Axis

Date - 10/15/41 Jackson 3  
Weather - Fair King  
Warm

Sta. + H.I. - Elev

#1  
B.M. 476.89

6.80 483.69

A-4  
B.M. 4.185 479.505

6.055 485.56

A-5  
B.M. 5.17 480.39

4.51 484.90

A-7  
B.M. 3.52 481.38

4.315 485.695

A-6  
B.M. 2.85 482.845

2.925 485.77

A-8  
B.M. 2.105 483.665

2.205 485.87

T.P. 6.00 479.87

5.255 485.125



Check on Bench Levels  
along Ramona Highway  
North of Dam Axis

Date - 10/15/41 Jackson 4  
Weather - Fair King  
Warm

Sta. + H.I. - Elev.

485.125

T.P. 6.78 478.345

5.395 483.74

476.89

6.85 476.89

Error = 0.00

Check on Bench Levels  
along Ramona Highway  
South of Dam Axis

Date - 10/15/41 Jackson  
Weather - Fair King  
Warm

5

Sta. + H.I. - Elev

#1  
B.M. 476.89

3.55 480.44

chis. O on top of culvert

head-wall near Axis on highway

T.P. 5.95 474.40

3.98 478.47

A-1  
B.M. 5.84 472.63

1.91 474.54

A-2  
B.M. 11.98 472.56

7.77 470.33

A-3  
B.M. 3.19 467.14

5.495 472.635

T.P. 0.18 472.455

6.485 478.94

#1  
B.M. 476.890  
2.055 476.885

Error = 0.005



Bench Levels - B.M #A-3 to Δ#16

NOTES

6.

STA	+	HI	-	ELEV.
				467.14

2434<sup>0</sup> 69.57<sup>0</sup>

B.M A-3. Knob Cor on Concrete Cul-  
vert.

TP		7.532		62.038
----	--	-------	--	--------

0539 62.577

TP		5.872		56.705
----	--	-------	--	--------

11626 68.331

TP		0.801		67.530
----	--	-------	--	--------

8.05<sup>7</sup> 75.587

B.M		4.747		470.840
-----	--	-------	--	---------

Rock knob on prominent outcrop on  
E of Ramona Rd.

12.972 483.812

TP		1.477		482.335
----	--	-------	--	---------

11.451 493.786

TP		0.466 <sup>75</sup>		493.311
----	--	---------------------	--	---------

11.707 505.018

TP		1.709		503.309
----	--	-------	--	---------

NOTES

503.309

6.147 509.456

B.M.

1.542 507.914

Rock knob 12' N.E. Δ #16

0.591 508.505

TP

12.172 496.333

1.944 498.277

TP

12.508 485.769

1.558 487.327

TP

12.091 475.236

1.569 468.805

13+57.25

10.8 466.0

Tkt Hub on W<sup>ms</sup> Rd

TP

12.117 464.688

1.797 466.485

12+12.68

11.495 454.990

X in concrete on E of Hwy + W<sup>ms</sup> Rd.



ELEV'S FOR FORMS - BIK #6

467

467.80

APR 8<sup>th</sup> 8

T.BM 3.88 <sup>52.38</sup> ~~52.33~~

~~448.50~~  
~~448.45~~

DICKINSON

6+21 9.16

<sup>43.22</sup>  
~~443.17~~

22.75 North F = <sup>5.82</sup> ~~5.87~~ to Grade = 449.04

6+21 9.02

<sup>43.26</sup>  
~~443.31~~

16.42 North F = <sup>17.43</sup> ~~17.53~~ to Grade = 460.84

6+06 7.24

<sup>45.14</sup>  
~~445.09~~

22.31 " F = <sup>8.25</sup> ~~8.30~~ to Grade = 453.39

6+06 7.60

<sup>44.98</sup>  
~~444.73~~

15.98 " F = <sup>20.47</sup> ~~20.46~~ to Grade = 465.19

5+97 1.55

<sup>50.22</sup>  
~~450.73~~

15.72 " F = <sup>16.98</sup> ~~17~~ to Grade = 467.80

T.P 7.01 <sup>57.40</sup> ~~457.35~~

1.99 <sup>450.39</sup> ~~450.34~~

5+97 0.29

<sup>457.11</sup>  
~~457.06~~

22.05 " C = <sup>1.11</sup> ~~1.06~~ to Grade = 456.00

TBM

891 <sup>468.49</sup> ~~448.44~~

7817 2.65 451.15

448.50

6+21 7.12

444.03

22.75 North F = 5'0" To Grade 49.04

6+21 (check) 7.81

443.34

16.42 North F = 17'48" " "

6+21 7.47

443.68

Bottom of Copper Water Stop

## Elevs Forms - Block # 5

APR 9<sup>th</sup> 9.

T.BM 0.13 511.73

511.60

DIXTINSON

5+70 11.59 500.14 12.06 North F = 4.25 To Grade = 504.39

5+70 7.93 503.80 11.95 South F = 1.20 To Elev. = 505<sup>00</sup>5+70 7.63 504.10 108.15 South F = 5.90 to Elev. = 510<sup>00</sup>5+51 11.97 499.76 107.2 North F = 18<sup>00</sup> to Elev 517.785+41 6.22 505.51 9.85 " F = 21<sup>04</sup> to Grade 526.555+41 1.94 509.79 15.46 " F = 6<sup>31</sup> to Grade 516.10



Bench Levels - Blocks 7-8-9-10

APR. 10<sup>th</sup> 10

T.BM	0.66	475.89	475.23	ON HIGHWAY	DICKINSON
T.BM #1	12.51	463.38		<u>BLOCK 6</u>	POLAK
	1.29	464.67			
TBM #2	9.27	455.40		<u>Block #6</u>	
	3.12	458.52			
TBM	9.15	449.37		Marked El. 449.35	
<hr/>					
T.BM	0.99	476.22	475.23	ON HIGHWAY	
T.P.	12.39	463.83			
	0.54	464.37			
TBM	2.54	461.83		Marked El. 461.84 - <u>Block #11</u>	
	0.23	462.06			
T.BM	12.71	449.35		Marked El. 449.35 - <u>BLOCK #10</u>	
	1.25	450.60			
TBM	6.00	444.60		Marked El. 444.59 - <u>BLOCK #9</u>	
	5.71	450.31			
TBM	1.81	448.50		<u>BLOCK 7-8</u>	

Bench Levels

APR 10<sup>th</sup> 11.

T.B.M. 757 456.07

448.50

TBM

0.68 455.39

Marked 455.40 - Block #6



FLEV-For Form - BLOCK<sup>4</sup> 10

T.BM 0.52 462.36

461.84

TP

1099 451.37

3.76 455.13

7+82

5.19

449.94

151.9 South - F = 3.48 to El. 453.42

13

ELEV. FOR FORMS - BLOCK #5

Apr 22 14  
DICKINSON  
Super

TBM 072	522.81	522.09		
5+70	7.70	515.11	10.50 North - F = 4 <sup>89</sup>	To Elev. 520 <sup>00</sup>
5+70	7.76	515.05	100.55 South - F = 4 <sup>95</sup>	" " 520 <sup>00</sup>
5+53	7.85	514.96	10.50 North - F = 5 <sup>04</sup>	" " 520 <sup>00</sup>
5+53	7.76	515.05	100.55 South - F = 4 <sup>95</sup>	" " 520 <sup>00</sup>
5+46	7.84	514.97	10.37 North - F = 6 <sup>33</sup>	Grade = 521 <sup>30</sup>
5+45	2.81	520.00	100.55 South	= Toe of slope
		072 522.09		



ELEV'S. FOR FORMS - BLOCK #9

BM 0.80 462.64 461.84

TP 12.93 449.71

0.42 450.13

7.82 3.59 446.54 151.90 South F=6.88 To Grade=43.42

3.51 447.34 6.30 443.83

Hole # 9-13<sup>o</sup> 5.7 441.6

Hole # 9-35<sup>E</sup> 4.1 443.2

BM 2.73 444.61 Marked ELEV. 444.59

46.5  
11.9

Apr. 22 15  
DICKINSON  
oper

	3.11	464.95		461.84		
<del>6+68.5</del>			543	464.06		Gr = 466.32
	8.93	470.50	338	461.57		Gr = 466.32
6+68.5			554	464.96	F 1.25 to invert 11° S. Axis	Gr = <sup>466.21</sup> <del>466.32</del>
7+13.0			556	464.94	F 0.81 to " " "	Gr = 465.75
6+68.5			562	464.85	F 5.12 to Elev 470° 15° N. Axis	
7+13			561	464.89	F 5.11 to " " "	
			545	465.05	F 4.95 to " " "	
6+76.8			553	464.97	F 5.15 to top of Gal. Pipe 720 N. Axis <sup>1' offset N.</sup>	Gr = 470.12
6+86.1			547	465.03	F 5.00 " " "	Gr = 470.03
6+95.4			548	465.02	F 4.92 " " "	Gr = 469.94
7+04.7			549	465.01	F 4.82 " " "	Gr = 469.83
6+76.8			544	465.06	F 1.06 to invert 11° N. Axis	Gr = 466.12
6+86.1			545	465.05	F 0.98 to " " "	Gr = 466.03
+96.4 approx			550	465.00	F 0.93 to " " "	Gr = 465.93
7+04.7			552	464.98	F 0.85 " " "	Gr = 465.83



ELEV. FOR FORMS Bit # 8

Rogers

May 4 - 1942 17

47050

64685

556 464.94 F 506 to

7413

554 464.96 F 504 to Elev 470° 1589 S Axis

~~556 464.94 F 50~~

BM,

867 461.83 = 461.81

IP

887 473.89 548 465.02

530 468.23 10.96 462.93

6.47 461.76

-0.05 470.28 470.33

5 528 465.00

523 465.05

807  
184  
51

7851  
10228  
1

466.22

20.28  
56.22  
4.06

CHECK Elev. of Gallery Pipes Bkt # 8

Rogers  
May 5-42 18

BM,	0.88	476.11		475.23			
TBM,	2.90	470.78	8.23	467.88			
6+762				5.74	465.04	F 508	Gr = 470.12
+861				5.68	465.10	F 507	Gr = 470.03
+954				5.69	465.09	F 485	Gr = 469.94
7+042				5.71	465.07	F 476	Gr = 469.83
IP	7.90	475.75	2.93	467.85			
B.M.			0.52	475.23	= 475.23		

69.94  
 85.02  
 1.87  
 69.92  
 65.09  
 4.85



ELEV. FOR FORMS B/E # 6

Rogers  
May 5-1942 19

	2.59	470.47		467.88		
6+20			541	465.06	F 494 to Elev 470 <sup>e</sup>	15.5' N/Axis
6+06			529	465.18	F 482 to " "	" "
5+97			508	465.39	F 461 to " "	" "
			0.47	470.0	Top of Pour Marks on Rock	
Grout Hole			4.0	466.5	Elev Grout Hole # 6 - 12 $\frac{1}{2}$ Sta 5+84	
T.P.	12.85	482.96	0.36	470.11		
5+78			4.28	478.18	F 22.37 to top of Fillet	Gr = 501.05
"			2	480.29	F 12.96	Gr = 493.25
	<del>4.24</del>	<del>485.29</del>	1.91	481.05		Gr = 589.25
	6.14	487.19				
5+78			2.51	484.68	F 4.57 to Bottom of Fillet	Gr = 489.25
	3.38	478.11	1.246	474.73		
T.B.M.			10.23	467.88	= 467.88	

1873

ELEV OF GROUT HOLE

Regrs  
May 5. 1942 20

8.31	460.32		452.01
Grout Hole 11-116		.66	
3.21	462.76	0.77	459.55
BM7		0.93	461.83 = 461.84

Grout Hole Sta 84186



ELEV. FOR FORMS BIK #11

Rogers

MAY 5-42

21

	0.49	462.33		461.84	
	6.64	458.73	10.24	452.09	
			8.29	450.44	F 2.98 to top of Batter 151.95 Axis Gr- 453.92
8+17			5.80	452.93	F 18.47 to top of Fillet 153.6 N Axis Gr- 471.40
"			4.54	454.19	F 5.41 to Bottom " 21.69 " " Gr- 459.60
T.P.	6.8'	462.93	26'	456.12	
B.M.			110	461.83	= 461.84

5460  
5419  
—  
541

7140  
—  
293  
7140  
—  
18.47

ELEV. OF GROUT HOLES

Rogers

May 5-1942 22

	12.44	496.05		483.61	
Hole #			5.7	490.0	sta
13-375					
B.M.		12.44		483.61	-483.61

B.M.	10.94	522.46		511.52	
Hole #			14.0	508.1	sta
14-125					
Hole #			2.6	519.9	
18-375					
B.M.		10.94		511.52	=511.52

B.M.	4.42	588.84		544.42	May 6-1942
------	------	--------	--	--------	------------

14.9  
25  
4.0



ELEV. FOR FORMS BIK# 5

Rogers  
MAY 6-1942 23

BM.	3.57	525.66		522.09			
5+20			5.62	520.04	F 496	to Elev 525	10° N. Axis
"			5.63	520.03	F 497	to " "	96.75 S. "
"			6.78	518.88	F 1.67	to Gallery invert	11° S. " Gr=520.55
5+67.23			5.74	519.92	F 2.47	to " "	" " Gr=522.39
5+62.23			5.36	520.30	F 2.14	to " "	" " Gr=522.44
5+51			5.62	520.04	F 496	to Elev. 525	10° N. Axis
"			5.63	520.03	F 497	to " "	96.75 S. Axis
"			4.84	520.80	F 9.11	to Gallery invert	Gr=529.93
5+41			5.48	520.18	F 6.37	to top of Filler	98.5 N. Axis Gr=526.55
5+31			5.18	520.48	F 16.57	to " "	8.80 Gr=532.05
5+26			0.21	525.45	F 16.85	to " "	8.27 Gr=542.30
T.P.	12.39	534.48	3.57	522.09			
5+26			1.90	531.58	0.73 Above Grade	13.88 N. Axis	Gr=531.85
BM,		12.39		522.09	= 522.09		

205  
96.75  
1948  
67  
" "

CHECK FORMS Blk # 8

Rogers  
May 6-1942 24

70.32	498.16		461.80		
10.09	471.93				
7+14		+1.29	479.22	7' above Galena invert	Gr = 466.22
7+14		+1.00	472.93	3.19 above top of Pipes	Gr = 469.74
6+67 <sup>5</sup>		+1.48	473.41	3.19 " " "	Gr = 470.22
B.M.	10.09		461.80	= 461.80	

734  
70.23

11.48

72.93  
69.74  
3.19

71.93  
466.32  
-----  
71.93  
472.26  
-----  
5.71  
22.22  
7.53  
1.29



## ELEV FOR FORMS Bk #3

Rogers  
MAY 6-1942 25

B.M.	0.79	597.27		596.48		
T.P.	0.91	585.25	1293	584.34		
4+70				5.14	580.11	F 4.89 to Elev 585° 4° N. Axis
"				5.14	580.11	F 4.89 to " " 5.15 S. "
"				6.02	579.23	F 1.42 to Invert Gr- 580.65
4+61				4.99	580.26	F 6.39 to " = 586.65
"				5.14	580.11	F 4.89 to to Elev. 585° 4° N. Axis
4+51				5.16	580.09	F 4.91 to Elev. 585° 5.15 S. "
"				5.02	580.23	F 4.77 to " " 4° N. "
4+41				5.09	580.16	F 10.87 to top of Fillet 3.40 N. " Gr- 591.03
T.P.	12.35	597.34	0.26		580.99	
B.M.	0.69	597.17	0.87		596.47	= 596.48
T.P.	8.10	592.45	12.82		584.35	
3+26.30				5.85	586.60	F 4.97 to Bottom of Fillet 2.02 N. Axis Gr- 591.57
"				4.61	587.84	F 12.16 to Top of Fillet 2.50 N. Axis Gr- 600.00
T.B.M.			3.40		589.05	= 589.04

CHECK FORMS BIK# 6

Rogers  
MAY 7-42 26

2.38 470.26

467.88

6+20

0.28

469.98

Elev. of Grade Strip

15.49 Axis

5+97

0.28

469.98

" " " " "

2.38

467.88



CHECK FORMS Blk # 11

0.72 462.56

461.84

8+17

Rogers  
MAY 7-48 27

BM ~~044~~ 475.70~~475.26~~~~6768<sup>s</sup>~~~~7413~~

566

570.04

F 496 to Elev 575° 15° N Axis

~~6768<sup>s</sup>~~

572

569.98

F 502 to " " " "

~~6488<sup>t</sup>~~~~570~~~~570.00~~

F 500 to " " " "

~~044~~

475.26

1166 473.50

461.84

7413

3.42

470.03

F 492 to Elev 575° 15° N Axis

6488<sup>t</sup>

3.44

470.06

F 494 to " " " "

7413

3.52

469.98

F 502 to " " 150.9 S "

3.39

470.11

F 4.89 " " " Random

3.42

470.08

F 4.92 " " " "

3.48

470.02

F 4.98 " " " 150.9 S Axis

3.39

470.11

F 4.89 to " " Random

3.39

470.11

F 4.89 to " " "



Elev For Forms Blt # 8 (cont'd)

Rogers  
May 8-42 29

473.50

1.69 472.16 3.03

470.47

2.13

470.03

F 4.97 to Elev. 475.00

B.M.

1031

471.85

= 471.84

## CHECK FORMS Blk # 5

Rogers  
May 8-42 30

	346	525.55		522.09		
5+70			0.55	525.00	Elev. Grade Strip	9.99 N Axis
+61			0.55	525.00	" " "	9.98 N. "
+41			0.53	525.02	" " "	10.00 N. "
+31			11.97	537.02	Top Fillet	Gr=532.05 8.77 N. "
5+71					N. Edge of Gallery	8.50 S Axis
5+61					Top of Gallery Pipe	Gr=528.07
6+62.23			3.12	522.43	Invert 11° S. Axis	Gr=522.44
			+2.16	527.71		
6+62.23			3.18	522.97		Gr=522.39
			0.29	525.46		
			0.55	525.00	Top of Pour	9.67 S. Axis

Length of Drain Pipe = 7.48 (Sta 5+61)

B.M.	8.27	530.36	3.46	522.09	= 522.09
	2.15	530.09	2.42	527.94	
B.M.		8.00		522.09	= 522.09



## CHECK FORMS BIK #2

Rogers  
May 9 - 1942 31

	167	623.10		621.43		
4+11			813	614.97	Set fill for drain pipe F 7.53 to top	Gr = 622.50
	299	622.57		619.58		
4+20			257	620.00	Elev. to Grade Strip 150 N. Axis	
4+11			407	618.50	" to invert 11° S. Axis	Gr = 618.50
"			430	618.27	" " " 25.97 S. "	Gr = 618.27
4+13.32			409	618.48	" to " 11° S. "	Gr = 618.50

B.M. 1.62 476.85 475.23

T.B.M. 303 476.90 2.98 473.87

B.M. 1.67 475.23 = 475.23 as above

~~T.B.M. 1.59 475.46 473.87~~

1.52 475.39

6+20 520 470.19 F481 to Elev 475° 15° N Axis

537 470.02 F498 to " " 134.75 S "

6+01 526 470.13 F487 to " " 15° N "

5+91 519 470.20 F293 to Top of Filled 146.7 N. " Gr 478.13

+84 541 469.93 F2057 to Top of " 1345 N. " Gr = 490.55

T.B.M. 532 479.19 1.52 473.87

B.M. 3.94 475.25 = 475.26 7009 491

4.19 475.00 D.S. intersection for elev 475°

490.55  
2057  
19.53

52°

3813  
2020  
793



CHECK FORMS BIK# 1

Rogers  
May 11-1942 33

B.M. 0.78 65220

65147

ELEV. FOR FORMS BIK #10

Ropers  
May 12-42 34

B.M. <del>7761<sup>E</sup></del>	3.64	478.87		475.23				
7761 <sup>E</sup>			8.94	469.93	F 5.07	to Elev 575 <sup>00</sup>	150 <sup>9</sup>	S Axis
			8.80	470.07	F 4.93	to " "	" "	"
8406			8.88	469.99	F 5.01	to " "	" "	"
"			8.82	470.05	F 4.95	to " "	" "	random
7761 <sup>S</sup>			8.79	470.08	F 4.92	to " "	" "	"
"			8.89	469.98	F 5.02	to " "	" "	15 <sup>0</sup> N Axis
—			8.82	470.05	F 4.95	to " "	" "	"
8406			8.91	469.96	F 5.04	to " "	" "	"
7797			2.67	476.20	Top of Drain Pipe	Length of Pipe =	4.09	
7788 <sup>A</sup>			2.80	476.07	" " " "	" "	" =	4.08
+79 <sup>1</sup>			2.86	476.01	" " " "	" "	" =	4.14
+69 <sup>3</sup>			2.98	475.89	" " " "	" "	" =	4.10
B.M.	3.64			475.23	=	475.23		



ELEV. FOR FORMS BIK #11

Rogers

May 12-1942 35

Bm 1.33 463.17 461.84

8+27 803 455.14 F 21.26 to Top of Filled 1486 N. Axis Gr = 476.40

" 558 457.59 F 201 to Bott. of " 21.19 N. " Gr = 464.60

8+17 780 455.37 F 16.03 to Top of Filled 1536 N. " Gr = 471.40

F to Bott. " " 21.69 N. " Gr = 459.6

71.40  
 55.14  
 16.03  
 76.40  
 55.14  
 21.26

6460  
 5209  
 7.01

ELEV FOR FORMS Bk # 5

Rogers  
May 12-42 36

TBM	850	536.44		527.94		
	<del>326</del>	<del>536.43</del>	327	533.17		
	820	541.37				
BM	162	541.36	163	539.74	= 539.78	Marked Rock
	305	536.22	819	533.17		
			828	527.94	=	starting TBM
	275	530.73		527.98		corrected elev
5770			561	525.12	F 4.88	to Elev 530 <sup>0</sup> 9.5 N. Axis
"			551	525.22	F 4.78	to " " 45 <sup>00</sup> S. "
"			574	524.99	F 5.01	to " " 92.95 S. "
5741			567	525.06	F 4.94	to " " 92.95 S. "
"			460	526.13	F 10.46	to Invert 11 <sup>0</sup> S. Axis Gr. = 536.59
"			568	525.05	F 4.95	to Elev 530 <sup>0</sup> 9 <sup>5</sup> N. Axis
5751			481	525.92	F 4.01	to Invert 11 <sup>0</sup> S. Axis Gr. = 529.93
			558	525.15	F 4.85	to Elev 530 <sup>0</sup> 9 <sup>5</sup> N. Axis
5731			499	525.74	F 11.31	to Top of Fillet 8.80 N. Axis Gr. = 532.05
			275	527.98		$\begin{array}{r} 37.05 \\ 25.74 \\ \hline 62.79 \end{array}$



CHECK FORMS BIK #10

Rogers

May 12-46 37

3.33 478.56

475.23

3.56 475.00

7+60<sup>5</sup>

4.16 474.40 Top of Pour S. side of Gallery

Gr-474.40

8+07

3.70 474.86

Gr 474.86

ELEVATION & LOCATION Grout Hole

# 18-25

38

BM 337 584.51

581.14

Hole #  
18-25

15.1

569.4

Sta 11+75.5



ELEV. FOR FORMS Bk # 1

Rogers

May 15 - 1902

39

	0.08	563.51		563.43		
5+20			8.52	554.99	F 5.01 to Elev 560°	6.5 N. Axis
"			8.56	554.95	F 5.05 to " "	33.08 S. "
"			8.60	554.91	F 5.09 to " "	70.15 S. "
5+11			8.46	555.05	F 6.36 to Top of Gallery Pipe	7.70 S. Axis Gr = 561.91
5+01			8.42	555.09	F 9.91 to Elev 560°	6.5 N. Axis
"			8.38	555.13	F 8.14 to Invert	11° S. Axis Gr = 563.27
" +			8.51	555.00	F 5.00 to Elev 560°	70.15 S. Axis
4+91			8.42	555.09	F 9.34 to Top of Fillet	6.16 N. " Gr = 563.43
+81			8.39	555.12	F 13.81 to " " "	5.61 N. " Gr = 568.93
"			4.26	559.23	F 1.25 to Bottom	" 10.13 N. " Gr = 560.50
			3.51	560.00	X at D.S. intersection	El 655 <sup>2</sup> 70.15

0.08

563.43

6101

5505

636

556.60

CHECK FORMS B16#6

Rogers

May 13-47 40

0.42	475.68		475.26			
5.25	475.55	5.38	470.30			<del>Gr = 483.55</del>
		5.59	469.96			Gr = 483.55
4.91		+2.75	478.30	Top of Filled	14.67 N. Axis	Gr = 478.30
5.20		0.55	475.00	Top of Pour	15.02 N. "	
5.01		0.55	475.00	" "	15.00 N. "	
		0.29	475.26			

5.74  
99.21

83.55  
6.996  
13.59



CHECK FORMS BIK # 8

Rogers  
MAY 14-42 41

478.480.04

475.26

7+60<sup>s</sup>

564

474.40

Grade Strip on Gallery

Gr = 474.90

8+07

518

474.86

" " " "

Gr = 474.88

504

475.00

Grade " Top of Pour.

7+60<sup>s</sup>

504

475.00

Top of Pour

14.98 N/Axis

7+80<sup>t</sup>

504

475.00

15.00 N/ "

8+07

504

475.00

" " "

15.00 N/ "

7+69<sup>e</sup>

Length of Drain Pipe (upper) = 4.1 ft.

7+79<sup>t</sup>

" " " " " = 4.15 "

7+85<sup>q</sup>

" " " " " = 4.05 "

7+97<sup>z</sup>

= 4.10 "

50.04  
74.10  
24.06

ELEV. FOR FORMS Blk # 10

Rogers  
May 15-42 42

522 48045

475.23

7+83.75

¢ Blk # 10

Axis

506

475.39

¢ Roadway F 494 top roadway Gr = 480.33

"

486

475.59

11° Rt. ¢ F 524 top of curb Gr = 480.83

"

520

475.25

11° Lt. ¢ F 558 " " " Gr = 480.83

14.36 W

541

475.04

F 586 To Top of Curb 11° Rt. ¢ Gr = 480.90

F 636 top of Pour 11° Rt. ¢ Gr = 481.40

"

542

475.03

F 587 to Top of curb 11° Lt. ¢ Gr = 480.90

F 637 top " 11° Lt. ¢ Gr = 481.40

14.06 W

546

474.99

F 541 to " Roadway ¢ Gr = 480.40

14.50 W

538

475.07

F 493 Top of Pour 2225 Rt. ¢ Gr = 480.00

"

556

474.89

F 511 Top of " " Lt. ¢ Gr = "

7.415. ¢ Key

520

475.25

F 505 Top of Roadway ¢ Gr = 480.30

"

"

528

475.17

F 563 Top of Curb 11° Rt. ¢ Gr = 480.80

"

"

543

475.02

F 578 " " 11° Lt. ¢ Gr = 480.80

T.P.

506

475.39

Marked Rock

B.M. 5.11 48034

475.23

TR

494

475.40

described above Marked Rock



ELEV FOR FORMS Blk # 10

Rogers  
May 15-42 43

T.P. 507 48046 475.39

7483.75

Sta & Blk # 10

17.415	Key	539	475.07	F 5.17 to top of Roadway	Gr = 480.24
"	"	546	475.00	F 5.21 to " Curb 11° Rt	Gr = 480.74
"	"	544	475.02	F 5.22 to " " 11° Lt	Gr = 480.74
50.5		488	475.58	F 4.50 to " Roadway	Gr = 480.08
"		515	475.31	F 5.27 to " Curb 11° Rt	Gr = 480.58
"		487	475.59	F 4.99 to " " 11° Lt	Gr = 480.58
87.085	Key	523	475.23	F 4.66 to Top Roadway	Gr = 479.89
"	"	528	475.13	F 5.21 to " Curb 11° Rt	Gr = 480.39
"	"	546	475.00	F 5.39 to " " 11° Lt	Gr = 480.39
97.085	Key	530	475.16	F 4.68 to " Roadway	Gr = 479.84
"	"	538	475.08	F <sup>5.26</sup> 4.26 to " Curb 11° Rt	Gr = <sup>480</sup> 479.34
"	"	527	475.19	F <sup>5.15</sup> 4.15 to " " 11° Lt	Gr = <sup>480</sup> 479.34

Cont'd on Page 45

CHECK FORMS Bk # 11

Rogers  
May 15-42 44

B.M. 3.52 465.36

461.84

B+17

+5.92

471.38

Top of Fillet 16.03' Axis

Gr = 471.40

5.36

460.00

Grade to top of Pour

3.52

461.84

= 461.84



Elev FOR FORMS Bit #10

45

Continued from p 43

48046

7+83.75

11890	531	475.15	F458 to Top of Roadway	Gr=479.73
"	532	475.14	F519 to " Curb 11° RT	Gr=480.23
"	533	475.13	F510 to " " 11° LT	Gr=480.23
121.90	537	475.09	F <del>453</del> <sup>160</sup> to " Roadway	Gr=476.73
"	538	475.08	F <del>514</del> <sup>165</sup> to " Curb 11° RT	Gr=476.73
"	542	475.04	F <del>518</del> <sup>169</sup> to " " 11° LT	Gr=476.73
130.81	542	475.04	Point L to Curve at Elev. 8240	11° RT
130.83	536	475.10	" L to " " " " 11° LT	Gr=476.73
134.23	548	474.98	F175 Top of Roadway F742 to Pt. on Curve elev 8240	11° RT Gr=482.40
"	536	475.10	F163 to top of Pav	Gr=476.73
"	539	475.07	F <del>166</del> <sup>166</sup> Top of Roadway F733 to Pt. on Curve elev 8240	11° LT Gr=482.40
"	546	475.00	F740 to " " " " " 22.25 RT	Gr=482.40
"	542	475.04	F736 to " " " " " " LT	Gr=482.40

ELEV FOR FORMS BIK #10

Rogers

May 15-42 46

480.46

7+83.75

150.90	535	475.11	F 162 to Top of Roadway $\phi$	Gr=476.73
"	535	475.11	F 162 to " " 11° RT $\phi$	Gr=476.73
"	"	475.11	F 491 to top of Curve 11° RT $\phi$	Gr=480.02
"	539	475.07	F 4.95 to " " " 22.25° RT $\phi$	Gr=480.02
"	545	475.01	F 1.72 to top of Roadway 11° Lt. $\phi$	Gr=476.73
"	"	475.01	F 5.01 to Top of Curve 11° Lt. $\phi$	Gr=480.02
"	542	475.06	F 4.98 to " " " 22.25° Lt. $\phi$	Gr=480.02



ELEV. For Forms - Block #6

MAY 16<sup>th</sup>  
DICKINSON 47

BM	488	480/4	475.26		
6+20		496	475.18	130.95	South of axis = F. 482
6+04		0.14	480.00	130.95	Toe of slope
6+20		5.22	474.92	14.50	North F = 5.08
6+04		4.95	475.19	14.50	" F = 4.81
5+91		5.05	475.09	14.50	" F = 4.91
5+81		4.81	475.33	129.2	" F = 20.47 Grade 495 <sup>80</sup>
5+81		3.33	476.81	19.25	" F = 7.19 Grade 484 <sup>00</sup>
		488	475.26		7681
					719

ELEV. FOR GROUT PIPES

48

BLOCK #10

BM 504 480.30

475.26

4.59 479.72

5.17 475.13

8.5 North

1.49

Fill To top bar E = 478.23

8.5 "

2.14

Fill to top bar 2.6 West = 477.58



ELEV FOR FORMS Bk # 9

BM.	5.15	480.41		475.26			
TP	489	480.02	528	475.13			
TP	3.09	470.16	1295	467.07			
7+37.25				6.00	464.16	F 1.34 to invert	11° S. Axis Gr=465.50
7+14				4.43	465.73	check on Conc	Gr=465.74 at invert
7+60.5				4.45	465.71	" " "	Gr=465.77 at "
7+37.25				6.15	464.01	F 1.09 to invert	40' S. Axis Gr=465.10
"				6.63	463.53	F 1.22 to "	75' S. " Gr=464.75
"				6.92	463.21	F 1.11 to "	115 S. " Gr=464.35
"				6.07	464.09	F 0.00 to "	140.90 S. " Gr=464.09
"				5.65	464.51	F 1.26 to "	15.92 N. " Gr=465.77
	10.50	475.75	4.91		465.25		
BM <sub>1</sub>		0.52			475.23	=	475.23

ELEV FOR FORMS Blk # 8

Rogers  
May 18-42 50

T.B.M.	517	480.30		475.13		
6+67.5			5.26	475.04	F 4.96 to Top of Pour	14.5 N. Axis
"						137.83 S Axis
"						150.90 S. " Gr-480.02
7+14			5.28	475.02	F 4.98 to Top of Pour	14.5 N. "
"						137.83 S. "
			5.23	475.07	F 4.95 to Top of Spillway	150.90 S. " Gr-480.02
T.P.	502	480.15	517	475.13		
6+67.5			5.17	474.98	F 5.04 to Top of Spillway	150.90 S. Axis Gr-480.02
"			5.11	475.04	F 5.96 to pt. on Curve	137.83 S. Axis Gr-481.00
6+90.75			5.01	475.14	F 5.86 to pt. on "	137.83 S. " Gr-481.00
"			5.09	475.06	F 4.96 to Top spillway	150.90 Gr-480.02
			5.14	475.01	F 5.99 to pt. on Curve	137.83 S. Axis Gr-481.00
		502		475.13		



ELEV FOR GALLERY PIPES BIK\*9

May 18-1942 51

TBM 3.04 470.11

467.07

<sup>23.30</sup>  
7+698

597 461.14 F548 to Top of Pipe 7.705 Axis Gr=469.62

<sup>32.6</sup>  
7+891

585 464.76 F529 to " " " " Gr=469.55

<sup>41.9</sup>  
7+884

595 464.16 F539 to " " " " Gr=469.55

<sup>51.20</sup>  
7+927

604 464.07 F558 to " " " " Gr=469.65

3.04

467.07 = 467.07

May 19-1962

52

	543	625.01		619.58			
4+20			5.04	619.97	F503	to TOP of FILLET	125 N. Axis El: 625°
3+91			4.69	620.32	F1.68	to TOP of Pour	125 N. Axis El: 625°
3+81			4.48	620.53	F9.09	to TOP OF FILLET	102 N. Axis Gr=629.62
4+035			5.13	619.88	F 0.48	to TOP of Porch	23.80 S. Axis Gr=620.36 1' offset west
"			5.24	619.77	F 5.23	to " " Pour	21.66 S " El: 625°
4+14 <sup>50</sup>			5.24	619.77	F 0.59	to Top of Porch	23.80 S. " Gr=620.36 1' offset East
4+20			5.05	619.96	F504	" Top of Pour	21.66 S. " El 625°
			0.01	625.00	X-D.S.	intersection	21.66 S "

543

2962  
2053



## CHECK FORMS B/k #10

Rogers  
May 19-42 53

BM 139	485.00	48361				
	7183.75					
1436 N.		411	480.89	Top of Curb	11° RT ♀	Gr = 480.90
"		409	480.91	" " "	11° Lt ♀	" = " "
14.46		458	480.42	" " Roadway	♀	Gr = 480.40
7.015		421	480.79	" " Curb	11° RT ♀	Gr = 480.80
"		423	480.77	" " "	11° Lt ♀	Gr = 480.80
"		470	480.30	" " Roadway	♀	Gr = 480.30
17.415		427	480.73	" " Curb	11° RT ♀	Gr = 480.74
"		428	480.72	" " "	11° Lt ♀	Gr = 480.74
"		476	480.24	Top of Roadway	♀	Gr = 480.24
50.5		444	480.56	" " Curb	11° RT ♀	Gr = 480.58
"		445	480.55	" " "	11° Lt ♀	Gr = 480.58
"		494	480.06	" " Roadway		Gr = 480.08
87.085		462	480.38	" " Curb	11° RT ♀	Gr = 480.39
"		463	480.37	" " "	11° Lt ♀	Gr = 480.39

CHECK FORMS B/L # 10

Rogers  
MAY 19-1960 54

48500

78325

87.085	512	480.88	Top of Roadway &	Gr-479.89
97.088	464	480.36	" " Curb 11° RT &	Gr-480.34
"	467	480.33	" " " 11° LT &	Gr-480.34
"	517	479.83	" " Roadway &	Gr-479.84
118.905	467	480.33	" " Curb 11° RT &	Gr-480.23
"	477	480.23	" " " 11° LT &	Gr-480.23
"	526	479.74	" " Roadway &	Gr-479.73
134.23	262	482.38	Point of Curve 23.25 RT &	Gr-482.40
"	262	482.38	" " " 11° RT &	Gr-482.40
"	261	482.39	" " " 11° LT &	Gr-482.40
"	258	482.42	" " " 23.25 LT &	Gr-482.40
146.	539	479.59	" " " 23.25 LT &	Gr-479.60
"	540	479.60	" " " 11° LT &	Gr-479.60
"	540	479.60	" " " 11° RT &	Gr-479.60
"	539	479.61	" " " 23.25 RT &	Gr-479.60



CHECK FORMS Blk #10

May

55

48500

748375

151.905

497

480.03

End of curve

11° RT &amp;

Gr=480.02

"

499

480.01

" " "

23.25 RT &amp;

Gr=480.025

"

498

480.02

" " "

23.75 LT &amp;

Gr=480.02

"

497

480.03

" " "

11° LT &amp;

Gr=480.02

118.05

sta. of Groat Stop (Galvan)

52.5

" " " " "

11.4N

" " " " "

14.50N

499

480.01

Grade strip 22.25 H. &amp;

El 480.0

" N

507

" " 22.25 RT &amp;

" "

BM,

139

483.61

= 481.61

ELEV FOR FORMIS Blk # 9

Rogers  
May 20-48 56

TBM 303	47010	46707					
713725		5.94	464.16	F. 0.82	to invert	52° S Axis	Gr = 464.98
"		6.31	463.69	F. 1.13	to	" 68° S "	Gr = 464.82
"		6.81	463.29	F. 1.37	to	" 84° S "	Gr = 464.66
"		6.90	463.20	F. 0.89	to	" 139.90 <sup>1' offset 1/2 from</sup>	Gr = 464.09
TBM	303		464.07	=	464.07		

139.90  
211.90  
64.90



GALLERY PIPE ELEV B/L #5

Rogers

May 20-42

57

B.M. 256 530.54

527.98

5771

4.76

525.78

F896 to TOP of Gallery Pipe

Gr = 534.74

B.M.

256

527.98

= 527.98

ELEV FOR FORMS BIK #3

May 20-1962

Rogers

58

BM	113	590.17		589.04	
4+70			5.16	585.01	F 4.99 to Elev 590° 3.50 N Axis
"			5.30	584.87	F 5.13 to " " 4735 S. "
4+61			5.08	585.09	F 6.37 to Top of Gallery Pipe 770 S Axis Gr=491.46
4+51			5.17	585.00	F 5.00 to Elev 590° 3.50 N Axis
4+41			5.03	585.14	F 5.89 to Top of <sup>Fillet</sup> Gallery 340 N Axis Gr=591.03
"			5.09	585.08	F 4.92 to Elev 590° 4735 S. "
4+31			5.01	485.16	F 11.97 to Top of <sup>Fillet</sup> Gallery 279 N Axis Gr=597.13
4+51			5.22	484.95	F 8.36 to Gallery invert. Gr=493.31
BM	113			589.04	= 589.04

50



## CHECK FORMS Blk # 8

Rogers  
May 20-02 59

B17	530	480.53		475.23		
	439	479.78	514	475.39		
6+68 <sup>S</sup>			+0.22	480.00	Grade Strip	14 <sup>S</sup> N. Axis
"			+0.23	480.01	Top of Wasteway	151.90 S. Axis Gr=480.02
7+13.0					Grade Strip	14 <sup>S</sup> N. Axis
"			+0.23	480.01	Top of Wasteway	Screened 151.90 S. Axis Gr=480.02
			+0.21	479.99	" " "	" (L) " " "
			+0.21	479.99	" " "	" (R) " " "
			0.21	479.57	Bottom of Screened	(L Blk) 146° S. " Gr=479.60
			0.21	479.57	" " "	(R) 146° S " Gr=479.60
7+13			0.19	479.59	" " "	146° S " Gr=479.60
			0.21	479.57	" " "	(R) " " "
6+68 <sup>S</sup>			0.19	479.59	" " "	" " " " = 479.60
			+0.19	480.97	Top of Wasteway	(R) 151.90 S. Axis Gr=480.02

ELEV FOR FORMS BIK #8

Rogers  
May 20-42 60

479.78

679075

13783.5.

+1.21 480.99 Point on Curve Top of Pour 2325 Rt Gr = 481°

" +1.20 480.98 " " " " " 11° Rt Gr = 481°

" +1.19 480.97 " " " " " 2 BIK Gr = 481°

" +1.19 480.97 " " " " " 11° Lt Gr = " "

+1.20 479.93 " " " " " 2325 Lt Gr = 481°



ELEV FOR GALLERY FORMS B16 #7

Rogers  
May 20, 42 61

	4.11	479.37		475.26			
	421	470.93	12.65	466.78			
6+39.60			5.53	465.40	F 8.74	to invert	11° 5 Axis Gr-474.14
6+48.90					F	to "	11° S. " Gr-
"			5.37	465.56	F 7.19	to Top of Pipe	7.70 S " Gr-472.75
6+51.23			5.39	465.54	F 0.85	to invert	11° S. " Gr-466.39
6+58.20			5.44	465.49	F 9.83	to Top of Pipe	7.70 S. " Gr-470.32
	9.71	478.03	2.61	468.32			
B.M.		2.77		475.26	=	475.26	

## CHECK FORMS Blk # 5

Rogers  
May 21-42 62

B.M.	306	531.04		527.98	
5470			1.05	529.99	Top of Bur 948 N. Axis
5431			+5.99	537.03	" " Fillet Form 8.76 " " Grade = 537.05
5406.72			+1.73	532.77	Gallery invert Form " = 532.78

Length of Gallery Pipe = 9.85

5470			0.91	530.13	Top of Form <sup>(92.85)</sup> 92.88 S. Axis
			0.70	530.34	" " " <sup>(92.70)</sup> 92.72 S "

T.P.	0.11	531.08	0.07	530.97	
------	------	--------	------	--------	--

			3.14	527.94	= 527.98
--	--	--	------	--------	----------

B.M.	3.21	531.19		527.98	check circuit.
------	------	--------	--	--------	----------------

	0.21	531.19	0.21	530.98	
--	------	--------	------	--------	--

B.M.			3.21	527.98	= 527.98
------	--	--	------	--------	----------



CHECK FORMS Blk # 6

63

520 480.46

475.26

6420

046

480.00

Grade Strip

14.46 N. Axis

5486

+6.59

487.05

Top of Fillet

12.80 N. Axis

Gr = 487.05

520

475.26

8705

8046

6.59

	157	485.18	483.61		
7+615			517	480.01	F 4.99 to Elev 485° 14° N Axis
"			486	480.32	F 5.68 to Pt. on Curve 128.375. " Elev 486°
7+71.25			424	480.94	F 5.06 to " " " 128.375 " El. = 486°
8+06			500	480.18	F 4.82 to Elev 485° 10° N Axis
"			505	480.13	F 5.87 to Elev <sup>Pt. on curve</sup> 486° 128.375. "
7+95.25			432	480.86	F 5.14 to Pt. on Curve 128.375. " Elev 486°

8+01  
 11.5  
 95.25  
 237.5  
 12

2.42 486.03 483.61  
 482 481.21



ELEV FOR FORMS BIK # 9

Rogers  
May 22-47 65

BM 0.13 483.74 483.61

TP 3.51 476.23 110.2 472.72

9.81 466.42 Elev. Top of Platform 3.50 R+G Gr. 466.42

9.81 466.42 " " " " 6.50 L+G Gr. "

6.31 469.92 " " Handrail 3.10 R+G

6.31 469.92 " " " " 6.10 L+G

8.06 468.17 " Bottom " 3.10 R+G

8.06 468.17 " " " " 6.10 L+G

8.23 468.00 " " Ladder Rung 4.30 L+G

10.87 473.59 3.51 472.72

2.48 473.94 2.13 471.46

BM, 0.32 473.62 = 473.61

## ELEV FOR FORMS

Blk # 9

May 22-42

Rogers

66

(cont'd)

T.B.M. 148	474.20		472.22		
T.P.	473	470.03	890	465.30	
743225			452	465.51	Invert of axis Gr=465.50
			460	465.43	" 6' S Axis Gr=465.04
			466	465.37	" 19' S " Gr=465.36
			493	465.10	" 38' S " Gr=465.12
			511	464.92	" 62' S " Gr=464.88
			521	464.82	" 70' S " Gr=464.80
			595	464.98	" 54' S " Gr=464.96
			548	464.55	" 94' S " Gr=464.56
			<del>567</del>	<del>464.36</del>	<del>" 110' S " Gr=464.40</del>
			580	465.23	" 128 S " Gr=464.22
			596	464.07	" 152 S " Gr=464.09
T.P.			0.10	469.93	-469.92 Elev. on Forms

$$\frac{152}{15} = 10 \frac{2}{3}$$



Forms Bk #9 (cont'd)

Rogers  
May 22-47 67

7+23.30

5.5 = length of Drain Pipe

7+32.60

5.4 = " " " "

7+41.90

5.4 = " " " "

7+51.20

5.2 = " " " "

Sta of Copper Water Stop =

2.6 S. of Axis & 13.1 N. Axis

14  
9.50  
277.

## CHECK FORMS BIK # 2

MAY 27-1942

Rogers

68

	7.04	626.62		619.58		
4+11			2.76	623.86	Elev. Top Handrail	3.10 L. &
"					"	6.10 RT. &
"			4.51	622.11	" Bottom	" 3.10 L. &
					"	" 6.10 RT. &

$$\begin{array}{r}
 620.36 \\
 3.50 \\
 \hline
 623.86
 \end{array}$$



ELEV FOR FORMS

Blk #6

May 23-42

69

	10.22	485.48		475.26	
5778			513	480.35	F 20.70 to Top of Fillet 12.40 N. Gr = 501.05
6420			550	479.98	F 502 to Elev 485° 14° N Axis
"			539	480.09	F 491 to " " 60° S "
"			541	480.07	F 493 to " " 127.15 S "
			473	480.75	F 425 to " " 127.15 S "
5491			541	480.07	F 493 to " " 14° N "
	10.22			475.26	= 475.26

501.05  
 80.35  
 -----  
 20.70

485

ELEV. FOR FORMS Blk # 8

Rogers

May 23-1942

70

BM, 1000	485.26		475.26		
6+68 <sup>2</sup>		5.21	480.05	F 495 to Top of Pour	El. 485° 14° N Axis
"		5.21	480.05	F 595 to Pt. on curve	El. 486° 128.375 "
6+83 <sup>33</sup>		5.08	480.18	F 582 to " "	El 486° 128.375 "
6+98 <sup>16</sup>		4.95	480.31	F 569 to " "	El. 486° 128.375 "
7+13		5.16	480.19	F 590 to " "	El. 486° 128.375 "
"		5.23	480.03	F 497 to Top of Pour	El. 485° 14° N "
BM,	1000		475.26	=	475.26



CHECK FORMS Bk # 7

Rogers  
May 23-42

71

Bm 3.71 478.97

475.26

2.23 471.38 9.82

469.15

1.34 470.02

Grade Strip Top of Pour to El 470.00

6+43.59

+0.08 471.46

Gr = 471.48

6+48.9

+1.37 472.75

Top of Gallery Pipe Length = 7.16

6+58.20

1.06 470.32

" " " " " = 4.80

T.P.  
1

5.98

465.40

= 465.40 El. on Forms

ELEV. FOR FORMS

Blk #1

Rogers  
May 23-46 92

	367	655.09		651.42	
3470			4.99	<sup>6</sup> 450.10	F 490 to Elev 650° 1° S. Axis
"			5.00	<sup>6</sup> 450.09	F 491 to " " 13° S. "
3446			4.93	<sup>6</sup> 450.16	F 484 to " " 13° S. "
"			4.98	<sup>6</sup> 450.11	F 489 to " " 1° S. "
3422			4.86	<sup>6</sup> 450.23	F 477 to " " 1° S. "
"			1.24	<sup>6</sup> 453.85	F 115 to " " 13° S. "
	367			651.42	

Elev. Bottom of Copper Water Stop: 650.23



R= 17.5  
a= 6.33      b= 11.80

**Block No. 8**

Station	S	Elev. "S"	"T"	Elev. "T"
6+57.5	16.80	457.00	23.13	445.20
+72.5	16.79	457.08	23.12	445.28
+77.5	16.78	457.16	23.11	445.36
+82.5	16.78	457.24	23.11	445.44
+87.5	16.77	457.32	23.10	445.52
+92.5	16.76	457.40	23.09	445.60
+97.5	16.75	457.48	23.08	445.68
7+02.5	16.74	457.56	23.07	445.76
+07.5	16.74	457.64	23.07	445.84
+14.0	16.73	457.74	23.06	445.94

Slopes = +0.016

R= 17.5  
a= 6.33      b= 11.80

**Block No. 9**

Station	S	Elev. "S"	"T"	Elev. "T"
7+14	16.58	459.20	22.91	447.40
7+60.5	16.58	459.20	22.91	447.40

Slopes = 0.0

R= 17.5  
a= 6.33      b= 11.80

**Block No. 10**

Station	S	Elev. "S"	"T"	Elev. "T"
7+60.5	16.69	458.11	23.02	446.31
+65.5	16.63	458.74	22.96	446.94
+70.5	16.56	459.36	22.89	447.56
+75.5	16.50	459.99	22.83	448.19
+82	16.42	460.80	22.75	449.00
+90.5	16.23	462.70	22.56	450.90
+95.5	16.12	463.82	22.45	452.02
8+00.5	16.01	464.94	22.34	453.14
8+07	15.86	466.40	22.19	454.60

Slopes = +0.224



Block No. 6 R= 17.5  
a= 6.33 b= 11.50

Station	S	Elev. #S#	#T#	Elev. #T#
5+738	11.98	505.25	18.31	477.47
+781.75	12.40	501.05	18.73	489.25
+81	12.92	495.80	19.25	484.00
+86	12.44	490.85	19.77	478.75
+91	12.96	485.90	20.29	473.50
+96	13.48	480.95	20.81	468.25
+101	14.00	476.00	21.33	463.00
+106	14.52	471.05	21.85	457.75
+111	15.04	466.10	22.37	452.50
+116	15.56	461.15	22.89	447.25
+121	16.08	456.20	23.41	442.00
+126	16.60	451.25	23.93	436.75
+131	17.12	446.30	24.45	431.50
+136	17.64	441.35	24.97	426.25
+141	18.16	436.40	25.49	421.00
+146	18.68	431.45	26.01	415.75
+151	19.20	426.50	26.53	410.50
+156	19.72	421.55	27.05	405.25
+161	20.24	416.60	27.57	400.00
+166	20.76	411.65	28.09	394.75
+171	21.28	406.70	28.61	389.50
+176	21.80	401.75	29.13	384.25
+181	22.32	396.80	29.65	379.00
+186	22.84	391.85	30.17	373.75
+191	23.36	386.90	30.69	368.50
+196	23.88	381.95	31.21	363.25
+201	24.40	377.00	31.73	358.00
+206	24.92	372.05	32.25	352.75
+211	25.44	367.10	32.77	347.50
+216	25.96	362.15	33.29	342.25
+221	26.48	357.20	33.81	337.00
+226	27.00	352.25	34.33	331.75
+231	27.52	347.30	34.85	326.50
+236	28.04	342.35	35.37	321.25
+241	28.56	337.40	35.89	316.00
+246	29.08	332.45	36.41	310.75
+251	29.60	327.50	36.93	305.50
+256	30.12	322.55	37.45	300.25
+261	30.64	317.60	37.97	295.00
+266	31.16	312.65	38.49	289.75
+271	31.68	307.70	39.01	284.50
+276	32.20	302.75	39.53	279.25
+281	32.72	297.80	40.05	274.00
+286	33.24	292.85	40.57	268.75
+291	33.76	287.90	41.09	263.50
+296	34.28	282.95	41.61	258.25
+301	34.80	278.00	42.13	253.00
+306	35.32	273.05	42.65	247.75
+311	35.84	268.10	43.17	242.50
+316	36.36	263.15	43.69	237.25
+321	36.88	258.20	44.21	232.00
+326	37.40	253.25	44.73	226.75
+331	37.92	248.30	45.25	221.50
+336	38.44	243.35	45.77	216.25
+341	38.96	238.40	46.29	211.00
+346	39.48	233.45	46.81	205.75
+351	40.00	228.50	47.33	200.50
+356	40.52	223.55	47.85	195.25
+361	41.04	218.60	48.37	190.00
+366	41.56	213.65	48.89	184.75
+371	42.08	208.70	49.41	179.50
+376	42.60	203.75	49.93	174.25
+381	43.12	198.80	50.45	169.00
+386	43.64	193.85	50.97	163.75
+391	44.16	188.90	51.49	158.50
+396	44.68	183.95	52.01	153.25
+401	45.20	179.00	52.53	148.00
+406	45.72	174.05	53.05	142.75
+411	46.24	169.10	53.57	137.50
+416	46.76	164.15	54.09	132.25
+421	47.28	159.20	54.61	127.00
+426	47.80	154.25	55.13	121.75
+431	48.32	149.30	55.65	116.50
+436	48.84	144.35	56.17	111.25
+441	49.36	139.40	56.69	106.00
+446	49.88	134.45	57.21	100.75
+451	50.40	129.50	57.73	95.50
+456	50.92	124.55	58.25	90.25
+461	51.44	119.60	58.77	85.00
+466	51.96	114.65	59.29	79.75
+471	52.48	109.70	59.81	74.50
+476	53.00	104.75	60.33	69.25
+481	53.52	99.80	60.85	64.00
+486	54.04	94.85	61.37	58.75
+491	54.56	89.90	61.89	53.50
+496	55.08	84.95	62.41	48.25
+501	55.60	80.00	62.93	43.00
+506	56.12	75.05	63.45	37.75
+511	56.64	70.10	63.97	32.50
+516	57.16	65.15	64.49	27.25
+521	57.68	60.20	65.01	22.00
+526	58.20	55.25	65.53	16.75
+531	58.72	50.30	66.05	11.50
+536	59.24	45.35	66.57	6.25
+541	59.76	40.40	67.09	1.00
+546	60.28	35.45	67.61	-0.25
+551	60.80	30.50	68.13	-0.50
+556	61.32	25.55	68.65	-0.75
+561	61.84	20.60	69.17	-1.00
+566	62.36	15.65	69.69	-1.25
+571	62.88	10.70	70.21	-1.50
+576	63.40	5.75	70.73	-1.75
+581	63.92	0.80	71.25	-2.00
+586	64.44	-4.15	71.77	-2.25
+591	64.96	-9.20	72.29	-2.50
+596	65.48	-14.25	72.81	-2.75
+601	66.00	-19.30	73.33	-3.00
+606	66.52	-24.35	73.85	-3.25
+611	67.04	-29.40	74.37	-3.50
+616	67.56	-34.45	74.89	-3.75
+621	68.08	-39.50	75.41	-4.00
+626	68.60	-44.55	75.93	-4.25
+631	69.12	-49.60	76.45	-4.50
+636	69.64	-54.65	76.97	-4.75
+641	70.16	-59.70	77.49	-5.00
+646	70.68	-64.75	78.01	-5.25
+651	71.20	-69.80	78.53	-5.50
+656	71.72	-74.85	79.05	-5.75
+661	72.24	-79.90	79.57	-6.00
+666	72.76	-84.95	80.09	-6.25
+671	73.28	-90.00	80.61	-6.50
+676	73.80	-95.05	81.13	-6.75
+681	74.32	-100.10	81.65	-7.00
+686	74.84	-105.15	82.17	-7.25
+691	75.36	-110.20	82.69	-7.50
+696	75.88	-115.25	83.21	-7.75
+701	76.40	-120.30	83.73	-8.00
+706	76.92	-125.35	84.25	-8.25
+711	77.44	-130.40	84.77	-8.50
+716	77.96	-135.45	85.29	-8.75
+721	78.48	-140.50	85.81	-9.00
+726	79.00	-145.55	86.33	-9.25
+731	79.52	-150.60	86.85	-9.50
+736	80.04	-155.65	87.37	-9.75
+741	80.56	-160.70	87.89	-10.00
+746	81.08	-165.75	88.41	-10.25
+751	81.60	-170.80	88.93	-10.50
+756	82.12	-175.85	89.45	-10.75
+761	82.64	-180.90	89.97	-11.00
+766	83.16	-185.95	90.49	-11.25
+771	83.68	-191.00	91.01	-11.50
+776	84.20	-196.05	91.53	-11.75
+781	84.72	-201.10	92.05	-12.00
+786	85.24	-206.15	92.57	-12.25
+791	85.76	-211.20	93.09	-12.50
+796	86.28	-216.25	93.61	-12.75
+801	86.80	-221.30	94.13	-13.00
+806	87.32	-226.35	94.65	-13.25
+811	87.84	-231.40	95.17	-13.50
+816	88.36	-236.45	95.69	-13.75
+821	88.88	-241.50	96.21	-14.00
+826	89.40	-246.55	96.73	-14.25
+831	89.92	-251.60	97.25	-14.50
+836	90.44	-256.65	97.77	-14.75
+841	90.96	-261.70	98.29	-15.00
+846	91.48	-266.75	98.81	-15.25
+851	92.00	-271.80	99.33	-15.50
+856	92.52	-276.85	99.85	-15.75
+861	93.04	-281.90	100.37	-16.00
+866	93.56	-286.95	100.89	-16.25
+871	94.08	-292.00	101.41	-16.50
+876	94.60	-297.05	101.93	-16.75
+881	95.12	-302.10	102.45	-17.00
+886	95.64	-307.15	102.97	-17.25
+891	96.16	-312.20	103.49	-17.50
+896	96.68	-317.25	104.01	-17.75
+901	97.20	-322.30	104.53	-18.00
+906	97.72	-327.35	105.05	-18.25
+911	98.24	-332.40	105.57	-18.50
+916	98.76	-337.45	106.09	-18.75
+921	99.28	-342.50	106.61	-19.00
+926	99.80	-347.55	107.13	-19.25
+931	100.32	-352.60	107.65	-19.50
+936	100.84	-357.65	108.17	-19.75
+941	101.36	-362.70	108.69	-20.00
+946	101.88	-367.75	109.21	-20.25
+951	102.40	-372.80	109.73	-20.50
+956	102.92	-377.85	110.25	-20.75
+961	103.44	-382.90	110.77	-21.00
+966	103.96	-387.95	111.29	-21.25
+971	104.48	-393.00	111.81	-21.50
+976	105.00	-398.05	112.33	-21.75
+981	105.52	-403.10	112.85	-22.00
+986	106.04	-408.15	113.37	-22.25
+991	106.56	-413.20	113.89	-22.50
+996	107.08	-418.25	114.41	-22.75
+1001	107.60	-423.30	114.93	-23.00

Block No. 7 R= 17.5  
a= 6.33 b= 11.50

Station	S	Elev. #S#	#T#	Elev. #T#
6+21	16.49	460.10	22.82	448.30
+26	-	460.05	-	448.25
+31	16.50	460.00	22.83	448.20
+36	-	459.95	-	448.15
+41	16.51	459.90	22.84	448.10
+46	-	459.85	-	448.05
+51	16.52	459.80	22.85	448.00
+56	-	459.75	-	447.95
+61	16.53	459.70	22.86	447.90
+67.5	16.54	459.64	22.87	447.84

Slopes - 0.01



Block No. 6 R = 17.5  
b = 6.53 b = 11.80

Station	S	Elev. "S"	"T"	Elev. "T"
5+718	11.98	505.25	18.31	497.47
+78	12.40	501.05	18.73	489.25
+81	12.92	495.80	19.25	484.00
+86	13.80	487.05	20.13	475.25
+88	14.15	483.55	21.00	466.50
+91	14.67	478.30	21.00	466.50
+97	15.72	467.80	22.05	456.00
6+01	15.84	466.64	22.17	454.84
+06	15.98	465.19	22.31	453.39
+11	16.13	463.74	22.46	451.94
+16	16.27	462.29	22.60	450.49
+21	16.42	460.84	22.75	449.04
+26	-	460.05	-	448.25
+31	16.50	460.00	22.83	448.20
+32	16.50	458.75	22.83	448.15
+33	16.50	457.50	22.83	448.10
+34	16.50	456.25	22.83	448.05

Slope = -1.75

Slope = -0.23

0



Block No. 4

R= 12.5    B= 0.55  
a= 4.52    b= 8.43

Station	S	T	Elev "S"	Elev "T"
4+71	5.06	9.58	574.43	566.00
4+76	5.33	9.85	571.68	563.25
4+81	5.61	10.13	568.93	560.50
4+86	5.88	10.40	566.18	557.75
4+91	6.16	10.68	563.43	555.00
4+96	6.43	10.95	560.68	552.25
5+01	6.71	11.23	557.93	549.50
5+06	6.98	11.50	555.18	546.75
5+11	7.26	11.78	552.43	544.00
5+16	7.53	12.05	549.68	541.25
5+21	7.81	12.33	546.93	538.50

5+21	8.09	12.61	544.18	535.75
+26	8.27	12.89	541.43	533.00
+31	8.80	13.42	537.05	528.60
+36	9.32	13.94	531.80	521.35
+41	9.85	14.47	526.55	514.10
+46	10.38	15.00	521.30	506.85
+51	10.91	15.53	516.05	99.60
+56	11.44	16.06	510.80	92.35

Slope = -1.05



Block No. 4

R= 12.5    S= 0.55  
a= 4.52    b= 8.43

Station	S	T	Elev "S"	Elev "T"
4+71	5.06	9.58	574.43	566.00
4+76	5.33	9.85	571.68	563.25
4+81	5.61	10.13	568.93	560.50
2+87	1' 21"	18' 22"	248' 22"	238' 20"
2+72	1' 21"	18' 02"	248' 02"	241' 52"
2+77	1' 50"	17' 12"	225' 12"	241' 00"
2+00	0' 28"	17' 20"	222' 18"	248' 12"

Block No. 5

R= 15.5    S= 10.45  
a= 5.61

Station	S	Elev. "S"	"T"	Elev. "T"
5+21	7.75	547.55	13.36	537.10
+26	8.27	542.30	13.88	531.85
+31	8.80	537.05	14.41	526.60
+36	9.32	531.80	14.93	521.35
+41	9.85	526.55	15.46	516.10
+46	10.37	521.30	15.98	510.85
+51	10.72	517.78	16.33	507.33
+56	11.07	514.26	16.68	503.81
+61	11.43	510.74	17.04	500.29
+66	11.78	507.22	17.39	496.77

slope = -1.05  
 de = -0.704



Block No. 2

R=10.0

S= 0.68

a= 3.279

b= 6.916

Sta.	S	T	Elev "S"	Elev "T"
3+71	0.68	3.96	636.42	629.50
3+76	0.85	4.13	633.02	626.10
3+81	1.02	4.30	629.62	622.70
3+86	1.19	4.47	626.22	619.30
3+91	1.36	4.64	622.82	615.90
3+96	1.53	4.81	619.42	612.50
4+01	1.70	4.98	616.02	609.10
4+06	1.87	5.15	612.62	605.70
4+11	2.04	5.32	609.22	602.30
4+16	2.21	5.49	605.82	598.90
4+21	2.38	5.66	602.42	595.50

Station	S	T	Elev "S"	Elev "T"
4+21	2.33	6.43	603.44	594.80
4+26.30	2.50	7.02	600.00	591.57
4+31	2.79	7.31	597.13	588.70
4+36	3.09	7.61	594.08	585.65
4+41	3.40	7.92	591.03	582.60
4+46	3.70	8.22	587.98	579.55
4+51	4.01	8.53	584.93	576.50
4+56	4.31	8.83	581.88	573.45
4+61	4.62	9.14	578.83	570.40
4+66	4.92	9.44	575.78	567.35
4+71	5.23	9.75	572.73	564.30



14 South  
 650-659 - No. batter  
 0.5 to 1 batter (650-600)  
 650-659 - a = 2.20  
 650-620 - a = 2.46  
 620-600 - a = 3.28  
 600-570 - a = 3.62  
 600-480 - 0.1 to 1 batter

Downstream  
 14 S. of Axis  
 659-645 - No. batter  
 640 - offset  
 14.64  
 635 - 16.54  
 630 - 18.92  
 625 - 21.66  
 620 - 24.79  
 615 - 28.35 batter  
 76 to 1

Block No. 1

R = 7.5    B = 0.55  
 a = 2.459    b = 5.187

Station	S	T	Elev "S"	Elev "T"
3+38.61	0.	2.46	650.00	644.81
3+41	0.0	2.52	648.69	643.50
3+46	0.20	2.66	645.94	640.75
3+51	0.34	2.80	643.19	638.00
3+56	0.48	2.94	640.44	635.25
3+61	0.62	3.07	637.69	632.50
3+66	0.75	3.21	634.94	629.75
3+71	0.89	3.35	632.19	627.00



183  
 $373861$   
 $790 \quad 0.9 \quad 80.14$   


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 $071 \quad 472$

$75.42$   
 $448486$   


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 $388$

$458.038$   
 $536$

$475.26$   
 $383$   

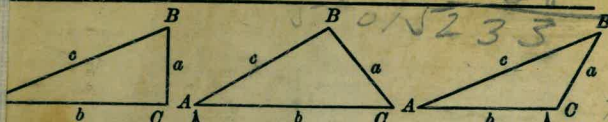

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 $479.09$

$455.42$   
 $7492$



TRIGONOMETRIC FORMULÆ



Right Triangle

Oblique Triangles

Solution of Right Triangles

Angle  $A$ .  $\sin = \frac{a}{c}$ ,  $\cos = \frac{b}{c}$ ,  $\tan = \frac{a}{b}$ ,  $\cot = \frac{b}{a}$ ,  $\sec = \frac{c}{b}$ ,  $\text{cosec} = \frac{c}{a}$

Given  $a, b$  Required  $A, B, c$   $\tan A = \frac{a}{b} = \cot B$ ,  $c = \sqrt{a^2 + b^2} = a \sqrt{1 + \frac{b^2}{a^2}}$

Given  $a, c$  Required  $A, B, b$   $\sin A = \frac{a}{c} = \cos B$ ,  $b = \sqrt{(c+a)(c-a)} = c \sqrt{1 - \frac{a^2}{c^2}}$

Given  $b, c$  Required  $A, B, a$   $B = 90^\circ - A$ ,  $b = a \cot A$ ,  $c = \frac{a}{\sin A}$

Given  $a, c$  Required  $B, a, e$   $B = 90^\circ - A$ ,  $a = b \tan A$ ,  $c = \frac{b}{\cos A}$

Given  $a, c$  Required  $B, a, b$   $B = 90^\circ - A$ ,  $a = c \sin A$ ,  $b = c \cos A$

Solution of Oblique Triangles

Given  $B, a$  Required  $b, c, C$   $b = \frac{a \sin B}{\sin A}$ ,  $C = 180^\circ - (A + B)$ ,  $c = \frac{a \sin C}{\sin A}$

Given  $a, b$  Required  $B, c, C$   $\sin B = \frac{b \sin A}{a}$ ,  $C = 180^\circ - (A + B)$ ,  $c = \frac{a \sin C}{\sin A}$

Given  $b, C$  Required  $A, B, c$   $A + B = 180^\circ - C$ ,  $\tan \frac{1}{2}(A - B) = \frac{(a - b) \tan \frac{1}{2}(A + B)}{a + b}$   
 $c = \frac{a \sin C}{\sin A}$

Given  $b, c$  Required  $A, B, C$   $s = \frac{a + b + c}{2}$ ,  $\sin \frac{1}{2}A = \sqrt{\frac{(s - b)(s - c)}{bc}}$   
 $\sin \frac{1}{2}B = \sqrt{\frac{(s - a)(s - c)}{ac}}$ ,  $C = 180^\circ - (A + B)$

Given  $b, c$  Area  $s = \frac{a + b + c}{2}$ ,  $\text{area} = \sqrt{s(s - a)(s - b)(s - c)}$

Given  $a, b, c$  Area  $\text{area} = \frac{bc \sin A}{2}$

Given  $B, C, a$  Area  $\text{area} = \frac{a^2 \sin B \sin C}{2 \sin A}$

REDUCTION TO HORIZONTAL

Horizontal distance = Slope distance multiplied by the cosine of the vertical angle. Thus: slope distance = 319.4 ft. Vert. angle =  $5^\circ 10'$ . From Table, Page IX.  $\cos 5^\circ 10' = .9959$ . Horizontal distance =  $319.4 \times .9959 = 318.09$  ft.  
 Horizontal distance also = Slope distance minus slope distance times (1 - cosine of vertical angle). With the same figures as in the preceding example, the following result is obtained.  $\text{Cosine } 5^\circ 10' = .9959$ .  $1 - .9959 = .0041$ .  $319.4 \times .0041 = 1.31$ .  $319.4 - 1.31 = 318.09$  ft.  
 When the rise is known, the horizontal distance is approximately: the slope distance less the square of the rise divided by twice the slope distance. Thus: rise = 14 ft. Slope distance = 302.6 ft. Horizontal distance =  $302.6 - \frac{14 \times 14}{2 \times 302.6} = 302.6 - 0.32 = 302.28$  ft.

